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AND

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By GEO. C. SCHAEFFER, and D. K. MINOR, Editors.

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RAILROAD POLICE.

Although we have often referred to this subject, we are convinced that much more may be said, and in fact must be said, in order to excite the proper feeling in regard to the most important branch of railroad economy.

The organization of a complete system of railway police is no slight task, and the difficulties are much increased by the essential differences which must prevail in all the minute details upon each line of road. Nevertheless, there are certain general principles which must in all cases be carried out, and the differences caused by local and peculiar circumstances are in all cases to be considered as the results of these principles.

The frequent occurrence of accidents of even trifling character, is most zealously to be avoided—as the confidence of the public becomes impaired and the character of railroads generally, is injured. Certain accidents may be considered as unavoidable, but none should be unforseen and unprovided for, and the strict adherence to this view will of itself be the means of preventing many mischances. For example, any malicious obstruction sufficient to throw the engine or cars from the rails may be, as far as the company is concerned, strictly speaking unavoidable, yet the proper provision for this or similar occurrences will prevent unnecessary delay, which would produce an entire derangement along the whole road, and almost as a matter of course entail further accident.

As a general rule the greater the power and extent of any machinery the greater is the mischief resulting from any derangement of its operations, and this certainly holds good for railroads, as experience has fully proved.

The first grand principle is the preservation of life and property, and here the interests of the public and the company are concomitant, whether we regard the property of the company or that of the public or the lives of travellers or of the company's agents, the loss of one is sure to bring about the loss of one or more of the others, and injury to either is detrimental to the interests of all parties. No one doubts that wanton carelessness, resulting in loss of life is to be blamed and punished as the highest degree of man-

slaughter, and yet how very frequently can this wanton carelessness be detected, even though it may consist in the omission of a screw or a bolt in the machinery or of a single word in an order.

Next to the safety of person and property, *despatch* is the most important principle in railroad management, and without it the advantages over other modes of conveyance are wholly lost. It is not enough that an extraordinary trip has been or can be made, but swift passages should always be insisted upon, and regularity in this respect is more productive of traffic than any other cause.

Thirdly, the personal comfort and convenience of travellers should be carefully studied, and attention to this principle involves very many particulars. Cars should be comfortable and *clean*—the depots protected from the weather—the arrangements for the reception and distribution of baggage should ensure safety and despatch, the times of starting should be convenient and when determined upon, conspicuously published by advertisements and by notices at the depots—all changes should be made known a suitable time previous to going into operation and the time advertised should be punctually adhered to—civility and politeness on the part of all the agents of the company should be most strictly required. These are a few of the many items falling under this head, and of their importance there can be no doubt. It must be remembered that among travellers there will always be found a portion of invalids, females, children and of those who are not so wide awake as to know where to go and how to avoid danger without the plainest directions and the absence of all possibility of getting into mischief. Such is the travelling public as it is found and for such provision must be made.

The chief means of carrying out these principles is the promulgation of simple and comprehensive yet definite rules, and although these rules may be frequently broken without any serious result, yet to permit habits of inattention, fines should be exacted for every violation of orders—a method of securing attention and obedience which is calculated to succeed admirably if we are permitted to judge from the experience of those who have adopted it.

These rules should not only contemplate certainties, but provide for contingencies—"*if* such and such a delay takes place you are to do so and so," —and it is in this very point that the excellencies of a system of police are shown. If any accident happens, every thing still goes on with regularity and decision and the passengers are at once reassured by the absence of either stupid indifference, or visible trepidation and indecision in all the agents of the company. At the same time no solicitations or entreaties should be allowed to induce any one to depart from the rules laid down, and one good effect of such rules would be to prevent any such interference, simply by doing away with the necessity for it—but when passengers find there is no law and no order and that no means have been taken to ensure their comfort or to preserve their lives and property—they have a sort of right to in-

terfere, for self preservation, although, unfortunately in such cases they know as little what to do or how to do it as those who have got them into trouble.

A very good because very simple method of saving time and trouble, is the adoption of a badge or uniform by which all the persons connected with the railroad may be at once detected, and the addition of a label designating each man's office. This latter also incidentally insures another advantage —it prevents the making of "men of all work" doing everything, and nothing properly.

Such, in fine, are a few of the means of forming a correct system of police, but the best way of arriving at the details will be the publication of the rules adopted by each company, together with the local or other reasons for any peculiarities which may exist. With this view we would solicit from railroad companies and engineers, a copy of such rules as they may have adopted, for publication in this Journal—the result of comparison of information thus obtained will lead to a mutual improvement, give confidence to the public and insure profit to the railroads.

CHESAPEAKE AND OHIO CANAL.

The Baltimore Clipper of August 19th, says:—"The American of yesterday announces the election of Col. *James M. Coale*, of Frederick, as president of this company, in the place of Gen. McNeil. This change was made by the meeting of stockholders held in Frederick on Thursday last. This act we presume, is to be understood as intending to exhibit the disapprobation of the stockholders, of the contract lately made between General McNeil and Mersrs. Leston & Co.; and leaves no room to doubt that the work which had been commenced under the contract will be discontinued. Notwithstanding this decisive disapproval of the course pursued by General McNeil, we doubt whether it would not have been more politic to have permitted the contractors to expend the $100,000 as contemplated—for, as we understand the contract, they could not have proceeded further without special legislation; and of course their claims would have been limited to the tolls on the portion of the work constructed by them, for interest on their outlay, while the principal was not to be redeemed in less than twenty years.

We regret the misunderstanding between General McNeil and the company, because we consider him an efficient and experienced officer. Heretofore he has always, we understand, given entire satisfaction to the companies by whom he has been employed—and in regard to this company, we cannot believe otherwise than that he has acted with a conscientious conviction that he was doing what was just and right, and most conducive to the company. The contract he entered into being now annulled, what is to be done? The work yields nothing, and interest is accumulating. In this condition it is out of the question for things to remain long. The canal must be pushed ahead, or the State's interest in it be sold, even at a sacrifice —for it would be the grossest folly to continue a tax of more than $400,000 a year for a work which is not even progressing to completion, and which of course holds out no hope of reimbursement."

It is much to be regreted that this great work is to be still longer delayed. We do not pretend to understand the merits of the controversy between the president and the company, but on a recent visit to Cumberland we came to

the conclusion that the completion of the canal to that place is of the first importance to the stockholders as well as to the owners of the coal and iron region about Cumberland; and it is singular indeed, that when so much has been done, and so little, comparatively, remains to be done, *Maryland and Virginia* and the *District of Columbia* should allow it to remain unfinished. Perhaps this controversy may effect, by arousing the people to investigate the matter, what the president is not allowed to do under his late contract. The town of Cumberland and its vicinity as well as the District of Columbia, have a deep interest in the completion of this work; and it appears to us that the *whole* income of the canal for a period, had better be given to those who will loan the company the means of completing it to the coal region, for it is in fact a loan by the contractors to the company for twenty years, thus to receive the tolls on that part of the canal between dam No. 6 and Cumberland, opened by the expenditure of $100,000 by the contractors.

Since the foregoing was written, we find the following remarks and protest in the Baltimore Clipper, which shows conclusively, as it appears to us, that the gentlemen representing, or rather *mis*representing the interests of Maryland, have done their late president very great injustice; and they must make out a very strong case of transcending his authority and instructions, or they will find him riding them rough-shod before they are aware of it. As the General says, "we shall see."

"*Chesapeake and Ohio Canal.*—The summary dismissal of General Mc Neil from the presidency of this company, by the agents of the State of Maryland, without the formality of referring the subject to the consideration of a committee, or affording him the opportunity for explanation and defence, is considered harsh and unjust, and will become a matter for the investigation of the legislature. It seems, from the following protests, that the measure was in opposition to the wishes of the representatives of the large stockholders, with the exception of Maryland; and courtesy towards those representatives should have induced less precipitancy on the part of the agents of Maryland.

"General McNeil was invited to the station he lately occupied; and, we understand, left a more lucrative situation to accept the presidency of the company. He felt desirous to push the work on to completion with the least possible delay, and he had every reason to presume that the board felt like anxiety, as a resolution was passed, expressing a willingness to contract for finishing the work to Cumberland on the precise conditions, we believe, of the contract which has given so much offence. But if the president were even in error in making the contract in question, it did not afford a justification for his *sans ceremonie* dismissal from office, as there cannot be a doubt that in what he did he had in view the interests of the company. Having been denied the privilege of making his defence before those who discharged him, he will, we are informed, give an exposition to the public; when, we shall be much mistaken, if he do not show that he has been unjustly treated.

"It is now evident that nothing will be done towards completing the canal until next spring, if then, and two hundred thousand dollars more of interest will accumulate in the meantime. This is wrong. It appears to be

adopting the policy of "saving at the spigot and losing at the bunghole." We are waiting for a cheaper contract, while we are losing in interest double the amount which we can hope to save by the cheap bargain. We wish the work to cost as little as possible, if it be completed at the expense of the State, and therefore desire to see it progressing, the procrastinating policy being ruinous.

"Col. Abert, in behalf of himself and others, asked leave to enter upon the proceedings of this day the following objections thereto, to be printed with the proceedings:

"1st. Because the meeting has refused the customary and just course of referring the matter in controversy in these resolutions, to the investigation and report of a committee.

"2d. Because the decision upon these resolutions is evidently made upon a one-sided report, from one of the parties involved, namely, the directors—a report which can be considered in no other light than that of a justification and defence of one party.

"3d. Because we believe that report to contain partial and erroneous inferences, personalities and harshness, eminently bearing upon the character and character and conduct of one of the parties, a report, which is, in fact, a defence of the directors, from themselves; and an attack upon the president, who was absent when said report was written and submitted to the stockholders.

"4th. Because we believe these matters require the investigation and opinion of an impartial and disinterested tribunal, namely, that of a committee of stockholders; without which course a just and impartial exhibition of the matter before the stockholders will not be in their possession.

"5th. Because that report from the directors brings new matters to the knowledge of the stockholders, not before brought to their knowledge; matters requiring deliberate and impartial investigation before a just decision upon them can be had.

"6th. Because from the personal explanation made this morning, August 17th, by the president, (who arrived last night,) we are the more convinced that investigation and report by a committee is necessary.

"7th. Because there is an application from the president, (which has been brought to the notice of the meeting this day) desiring that the matter may be referred to a committee to report at an adjourned meeting, and that he may be allowed an opportunity to be heard in his defence and justification. (Signed)

JOHN J. ABERT, (U. S. proxy.)
M. ST. CLAIR CLARKE,
ROBERT H. MILLER, (as proxy for corporation of Alexandria.)
CASPER W. WEVER,
SAMUEL BURCHE."

August 17th, 1843.

"The undersigned did not affix his name to the above protest, because he was disinclined to ask courtesy at the hands of those who had refused justice.

"The appointment of a committee, asked for by the representative of the United States and others was refused by the agents of Maryland, because they intended to return home the next day, and had not time therefore for an investigation: and the resolutions offered by the said agents were not discussed (so far as the undersigned was concerned) because he saw that the case was prejudged already; that the resolutions themselves were intened to carry out what it was admitted had been aimed at more than one month earlier, and before the contract referred to them had been entered into.

"For these reasons and more, the undersigned, at the moment of voting, made his verbal protest against the action of the agents of Maryland as *hasty and inexpedient.* He does so and in the same words still.

J. H. ALEXANDER."

For the American Railroad Journal, and Mechanics' Magazine.

CROTON WATER PIPES BURSTING.

We often hear of the main pipes, and also the house or service pipes bursting, by the great pressure of the water, and the public are not informed sufficiently on the subject. We are told, "that suddenly shutting off the water, is very likely to burst the pipe." In this "age of reason," we can generally trace cause and effect, and as we can in this instance, we will first make an assertion, and then endeavor to prove it.

"The water that runs through the pipe in this city, by its own motion given, by the head at the reservoir, can be made to burst almost any pipe through which it is allowed to pass with its full force, by stopping the motion of the water instantaneously, provided the pipe is long enough." We will now endeavor to prove the assertion; therefore we will say that a body of water is noncompressible, as much so as steel, or any other metal we now know of; we will set the water in motion, in a pipe whose length is represented by 1, the weight of the water in the pipe as 1, which strikes when in motion with that force, on shutting off suddenly. The pressure or power of the Croton water on the square inch we will also assume as 1, and the *motion* of the water also 1, (this is done to make it plain to all,) we will now take a pipe whose length shall be 100, it will contain *one hundred* times the weight of water, with the pressure the same and the motion of the water the same; now should the stop-cock of this pipe be shut, the motion of the water with the same rapidity will cause 100 times the strain acting to burst the pipe, and the length of the pipe may be increased until the power is so great as to burst pipes any number of times thicker than those which now sustain the pressure of the Croton water.

Though the service pipes may be ten times as strong as the main pipes, yet the stronger pipe will burst first, because the motion of the water is but slightly affected in a 12 inch main, by a small stream of water being taken from it, even with great rapidity.

Say a 12 inch main is supplying a $\frac{5}{8}$ pipe, the water in the 12 inch main will run or move 1 foot while the water in the $\frac{5}{8}$ pipe will run or move over 311 feet, thus conclusively showing that if the pipe is burst by the motion of the water being suddenly checked, the $\frac{5}{8}$ pipe must be 311 times as strong as the 12 inch main, showing most conclusively that *no established strength of pipe* can do our citizens justice.

Proportion is the beauty of these arrangements which is always varying under these circumstances according to the length of the pipe and the mode of stopping the current of water.

This requires some very matured plan to prevent those who take the water into their houses, through a long pipe, being very seriously troubled

by their pipes bursting. Many may think that they are safe because their pipes stand the pressure of the Croton water, but practice has proved that a succession of blows in a pipe from what is called "the water hammer" will burst a pipe after it has been in use for some years.

You will hear from me again in your next number.

New York, August, 1843. CIVIL ENGINEER.

WESTERN RAILROAD—THROUGH FARE, REDUCED.

The competition that has grown up between this road and the river and sound navigation, it would appear by the following extract of a letter from an agent of this road, has induced the directors to reduce the *through* freight on flour to 20 cents per barrel. We have been informed, that with the new engines the company are procuring, that they can carry a barrel of flour with profit, at 12½ cents. It will be seen that all a railroad wants, is sufficient business to insure cheap rates of transportation.

The Western and the Worcester railroads are undoubtedly well constructed, but the heavy grades on the former, of 80 feet to the mile, with a rise of 1480 feet above tide in the short distance from the Connecticut river to the summit, with another summit between Springfield and Worcester of 900 feet, adds greatly to the expense of transportation, yet we find the nett earnings the first year on the whole line from Albany to Boston, 200 miles, at about 4½ per cent. The road, too, is in its incipient state. The directors, we will add, are learning their lesson, so to "fix the rates of transportation at low prices as to command freight, with an increase of nett income."

If flour can be transported 200 miles over grades of 60 to 80 feet for 11 miles for 20 cents per barrel, we do not see any difficulty in constructing a railroad from Buffalo to the Hudson, on a level or descending line, so as to carry it at the rate now charged by the State for tolls, to wit, 38½ cents per barrel. If this can be done at a profit, and we do not doubt it, would it not be well to lay a track of *good edge rails* from Buffalo to the Hudson instead of enlarging the canal. If properly located and constructed, a substantial road, with a double track, need not cost to exceed nine millions of dollars.

We think it can be demonstrated, that with a railroad equal in construction to the Western, the Philadelphia and Reading, or the Boston and Lowell, the tonnage that now floats on the Erie canal can be transported by railroad at rates cheaper than the prices now charged on the Erie canal, provided the railway has half the business. It certainly can be done with the addition of the immense number of passengers passing this thoroughfare. Let us look at it. A calculation like the following, may be a safe one.

The tonnage floating on the Erie canal the last year exceeded 600,000 tons, say that two-thirds or 400,000 tons would equal the average of through tonnage for the season of seven months. Five trains, daily, would carry this tonnage at a handsome profit, at $4 per ton, from lake Erie to the Hud-

son. This would yield for *freight*, $1,600,000

With respect to *passengers*, it is not extravagant to estimate that calculating the *way* with the *through* passengers, that they would equal, if not exceed 100,000 per annum, paying from Buffalo to the Hudson. We think it will be double this number. At the moderate rate of $6 for each through passenger, we have 600,000

$2,200,000

If we allow the liberal rate of 50 per cent for expenses, and to keep the road in perpetual repair, we have $1,100,000 as the profit on an investment of $9,000,000 for a double track. J. E. B.

"I send you a statement of the rates for flour on the Western road:

"From Greenbush to Pittsfield	27	cents."
" " Dalton	30	"
" " Hinsdale	32	"
" " Becket	33	"
" " Springfield	33	"
To any station east of Springfield except Boston	34	"
To Boston	20	"

CANAL STATISTICS.

From the Albany Argus of 12th August, we take the following comparative statement of the business of the Erie canal for five years, to 1st August, each year.

"Comparative statement of flour and wheat shipped at Buffalo, Black Rock and Oswego, and also of the quantity arrived at tide water to 1st August.

	Shipped at Buffalo,		at Black Rock,		at Oswego.	
	Flour, bls.	Wheat, bush.	Flour, bls.	Wheat, bush.	Flour, bls.	Wheat, bu.
1839,	158,681	431,530	29,366	2,183	56,672	54,077
1840,	540,984	210,812	33,412	3,094	46,358	36,294
1841,	367,154	386,171	50,052	27,925	35,742	40,958
1842,	278,697	386,475	43,677	16,263	42,499	5,187
1843,	435,120	737,347	39,018	10,994	61,577	37 355

	Arrived at tide water.	
	Flour, barrels.	Wheat, bushels.
1839,	324,624	108,028
1840,	628,850	214,451
1841,	624,624	117,090
1842,	535,894	230,926
1843,	672,803	191,051

Taking flour and wheat together (the wheat being reduced to barrels of five bushels) the shipments at Buffalo, Black Rock and Oswego, and the arrivals at tide water to the 1st August, are as follows, viz:

	Shipments, equal to	Arrivals, equal to
1839,	342,277 bbls.	346,224 bbls.
1840,	478,795 "	671,740 "
1841,	544,719 "	648,042 "
1842,	424,458 "	582,081 "
1843,	690,854 "	711,013 "

The above statement shows that the arrival in each year at tide water to

the 1st August, since 1838, has exceeded the import from western States as follows. Of the arrival at tide water there was

	From western States. bbls.	From this State. bbls.	Total. bbls.
1839,	342,277	3,947	346,224
1840,	475,795	195,495	671,740
1841,	544,719	103,323	648,042
1842,	424,458	157,623	582,081
1843,	680,854	20,159	711,013

These excesses of arrival of flour at tide water in each year to the 1st August, over the imports from western States to the same time, represent the surplus of our own State, coming to tide water in each year.

Merchandize.—Statement of the tons (2000 lbs.) of merchandize sent from tide water, and of the quantity received at Oswego, Black Rock and Buffalo, to 1st August, viz:

	Shipped at Albany and West Troy.	Delivered at Oswego.	Black Rock.	Buffalo.
1839,	59,779	5,230	58	20,789
1840,	43,255	2,766	47	10,139
1841,	55,972	5,174	29	13,681
1842,	39,258	4,189	28	10,652
1843,	44,666	3,899	5	14,980

In connection with the preceding valuable and interesting statements, we repeat the account (given on Monday) of tolls received on all the canals of this State, and of the lockages at Alexander's lock, three miles west of Schenectady, to the 1st August, viz:

	Tolls.	Passages at Alexander's lock.	
1839,	$761,423	10,646	
1840,	716,526	11,555	
1841,	912,224	13,486	
1842,	750,951	10,090	
1843,	858,485	9,668	
The increase over last year is			$107,534
Of this increase there is at Buffalo		68,459	
" " West Troy		28,424	
" " Albany		6,368	—103,251
Leaving for increase at all other offices,			$4,283

The $103,251 represents the increase of produce from, and merchandize to, western States, by the way of Buffalo. The $4,283 represents the increase over last year in the *home business*, or business of this State."

PROFESSOR MORSE'S ELECTRO MAGNETIC TELEGRAPH.

We have been recently favored with an opportunity of witnessing some remarkable experiments preparatory to the construction of the telegraphic line between the cities of Baltimore and Washington. Wires to the total length of 158 miles having been prepared, it was thought proper by Professor Morse that this unusual length of wire should be used as a test of the powers of his system and also as a means of determining such points of scientific inquiry as might depend upon the employment of apparatus of such remarkable magnitude.

Several scientific gentlemen were present—Prof. Renwick of Columbia

college, Prof. Draper of the New York city University, Prof. Ellet of the south Columbia college, J. R. Peters, C. E., and Drs. Fisher and Gale, assistants to Prof. Morse. The arrangements from their temporary character, were not intended to show the perfect working of the finished telegraph. The powerful battery employed was operated under the disadvantages of imperfect insulation and the dampness of the earth above which they were supported—this was feelingly demonstrated by the liberal supply of shocks given in every direction by the slightest contact. Notwithstanding the disadvantages the results were such as to afford the utmost gratification to all present. The battery employed was of the form known as "Groves' Constant Battery," with plates of platinum in pure nitric acid, and amalgamated zinc in dilute sulphuric acid—the two liquids separated by a porous diaphragm. One hundred of these pairs were sufficient to work the magnets through the whole 158 miles of wire, and that too, in the space of a scarcely appreciable fraction of a second of time. A portion of this interval was consumed in overcoming the resistance of the spring attached to the moving point and the friction of the joint, so that as far as speed of communication is concerned we may safely say that the action is instantaneous through this length of wire. This result although in accordance with the known laws of electric action, was yet, gratifying as affording a confirmation of them when applied to an "extreme case." The use of a larger number of pairs, of course increased the power of the magnets.

A series of experiments was then made to ascertain the resistance to passage of the electric current by various lengths, of from 2 to 158 miles of wire. The result was again in accordance with what had been predicted. This resistance increases rapidly with the first few miles, and less and less rapidly afterwards, until for very great lengths no sensible difference can be observed. This is a most fortunate circumstance in the employment of electro magnetism for telegraphic purposes, since, contrary to all other modes of communicating intelligence, the difficulty to be overcome decreases in proportion to the distance.

Several other experiments, suggested by the unusual opportunity of a very large battery, were then made—and one circumstance throughout the whole time consumed, several hours, was worthy of note—we refer to the remarkably constant effect of the battery. This is one of the advantages of recent improvements, since the apparatus formerly in use, was subject to a very rapid and permanent loss of power.

Since these experiments were made, we have seen in the Glasgow "Practical Mechanic and Civil Engineers' Magazine," a description of the telegraph of Messrs. Cooke and Wheatstone—a more recent invention than that of Prof. Morse, as may be seen by a reference to our number containing the report of the committee in congress, on the bill giving an appropriation for a trial of Prof. Morse's plan. Notwithstanding the early date of this invention, 1832, the article in question gravely asserts that the history of electro magnetic telegraphs dates from the year 1836, although the prior-

ity of invention by Prof. Morse, was known to most of the scientific men of Europe.

An attentive examination of the two plans, will soon convince any one understanding anything about such matters, that they never can become rivals. The telegraph of Cooke and Wheatstone, although similar, to that of Morse in principle, is totally different in its applications. In the English telegraph a number of signs to denote the letters of the alphabet or the signals of an arbitrary code are *exhibited*, not written down. They may be compared to the manual alphabet of the deaf and dumb, with this exception, that three successive signs are required for some letters, and the dial must be attentively watched or the signals are lost and cannot be recovered unless by a second transmission. In the American telegraph the intelligence is written down, and anything expressed by ordinary written language, letters, figures or cyphers, may be instantaneously transmitted and recorded, even in duplicate, triplicate or quadruplicate, if desirable. The absence of an attendant, therefore, makes no difference in the reception of intelligence. The American invention has the advantage, also, in point of expense and from several ingenious improvements in the mode of preparing and laying the wires, we feel assured that its liability to derangement is far less than that of the more costly English telegraph.

In its most elementary form the apparatus of Cooke and Wheatstone has been in use upon several railroads, and if the power of transmitting but two signals, as on the Blackwall railway, is worth the original outlay, the possession of an unlimited communication for the purposes of the company or of individuals, must certainly be worth much more, and yet the cost is in fact less.

A single track of railroad of any length can be made as effective and as safe by means of this auxiliary, as any double track can be, and this too, at an original outlay of about the sum required annually to keep a track in repair. The advantages to railroads of this important invention can easily be understood by those familiar with railroad management, and if to these we add the profit to be derived from the transmission of intelligence, we certainly think there is ample inducement for its employment upon every railroad in the United States.

RAILROAD SUCCESS.

Who can say that railways are not profitable? The Attica and Buffalo railroad, commenced two years since, has been finished and put into operation, at the very moderate cost below named. A semi-annual dividend of 3 per cent., too, is declared for the first six months. We are sorry that such enterprize and such a reward should not belong to the citizens of our own State. But if New England builds our railroads it is no more than fair that she should be handsomely remunerated.

Attica and Buffalo Railroad.—The whole length of the road, including branches and turnouts, is 32 miles, constructed in a good substantial man-

ner at a total cost of $259,366. The personal property owned by the company consists of three locomotive engines, six first class passenger cars, five second class passenger cars, two baggage cars, one mail car, twenty-five freight cars, and cost $31,307.

The receipts of the road from passengers, exclusive of pay for carrying the mails, for the four weeks ending August 20, were $6,310·94. Whole number of passengers carried during those four weeks, 9630. The current expenses for running and repairing cars and road in the same time was $1,305·76. The directors have just declared a semi-annual dividend of 3 per cent.—*Buf. Com. Adv.*

REPORT OF THE ENGINEER IN CHIEF OF THE GEORGIA RAILROAD AND BANKING COMPANY.

To the Hon. John P. King, President Georgia Railroad and Banking Company:

SIR: An unavoidable absence from the State until within a few days past, will prevent me giving as detailed an account of our operations since the last convention, as I had intended. I trust, however, that the stockholders will be able, by a careful examination of the numerous statements accompanying this report, to satisfy themselves as fully of the condition and state of their affairs as though I had been more comprehensive in my remarks.

The extension of our road beyond Madison, so frequently agitated, has been commenced during the past year, and it is to be hoped that the exertions of the company to continue its progress to the State railroad, will be unremitted. There never was a period more propitious for the execution of such work than the present, and by a continued and vigorous prosecution of the enterprize, we shall be enabled to witness its entire completion, in time to meet the tide of prosperity which there is now every indication, will shortly dawn upon our country.

There is no section of the Union, having equal local advantages, where land can be procured on such favorable terms, as in the extensive region to be drained by the Western and Atlantic railroad. The expense of transporting produce to market, has heretofore retarded its growth; but as this difficulty will shortly be overcome by the completion of a continuous line of railroad from the sea-board, stretching around ours 350 miles into the interior, we may expect a rapid increase in her population and wealth. Notwithstanding the sparseness of its present population, a large share of our business is now derived from this region, which, if we should fail to connect with the State railroad, will in a great measure, be lost to us. We shall then be thrown back for support upon the trade of the old counties from whence Augusta derived her prosperity. These, though originally possessing a bountiful soil, have, by a false system of agriculture, become exhausted, and are now unable to afford us a large transportation. The opening of fresh counties in the west and north west section of the State, has hitherto sustained the prosperity of this city; but if we should pause in our progress, these new streams will be diverted to other channels, and as a necessary consequence, she must continue to decline.

Our contracts for grading, terminate near Covington, about 23 miles above Madison. From this point, we think, that if the road should not be farther extended, we shall be able to command, in consequence of the present superiority of the Augusta market, and the choice of those on the seaboard, which our route presents in an eminent degree, the transportation of the larger portion of the cotton produced by the counties west of us. It will also give us an important advantage in the transportation of the mail and passengers, and enable us to obtain the much desired object of traversing our road with the mail train down, for the most part, by day light.

Our present contracts end at a point convenient to pass from thence, either through Covington, or by a more direct route, leaving it about one mile to the left. The distance saved by this cut-off, is seven-eighths of a mile, and the cost of graduation, etc., lessened by it $17,000, to which should be added for the cost of the superstructure on the distance saved, and the capital on the annual amount expended to sustain the increased length of road, and the consequent additional cost of transportation thereon, $14,000; making the whole actual saving, $31,000.

Under a contract with the Middle Branch railroad company, we agreed to pass through the village of Covington; the charter of that company having expired, the legal binding of that contract has ceased; but the moral obligation to fulfil it, is still in force, and it appears to me that it can only be removed by the consent of the individuals with whom the contract was made, or their assignees, voting in proportion to the interest held by each in the company. Whether efforts to obtain their consent shall be made, is referred to the consideration of your board.

The estimated cost of preparing the road between Madison and Covington (26 miles) for the reception of the superstructure, is $215,000, including the purchase of the right of way. Of this sum, $170,000 will be provided for by the Newton county stockholders, under an arrangement with them to work out their indebtedness for stock, upon terms that were considered equitable and just between the parties. The remainder will have to be met by cash payments. The grading and bridging on the line beyond Covington, including the right of way, is estimated, at the present reduced price of labor, at $175,000, making the cost of preparing the road bed on the entire extension of the line to the Western and Atlantic railroad, $390,000.

The superstructure will vary according to the plan adopted, and the contingency of the admission of the iron free of duty, from $275,000 as the minimum, to $475,000 as the maximum cost. From recent information, I entertain little doubt, but that the duties on the heavier description of iron rails, will be remitted by the next congress, in which event the cost of the superstructure laid with a T rail, will not at the present price of iron, exceed $370,000. The whole cost of the road, 68 miles in length, would then stand thus:

Grading, bridging and right of way,	390,000
Superstructure,	370,000
Superintendence, etc.,	30,000
Total,	$790,000

equal to $11,600 per mile, which is unusually low, considering the broken nature of the ground, encountered in passing the valleys of the Alcovy and Yellow rivers. The first with a bridge of 1000 feet in length, and 72 feet above the water, and the other 400 feet long, and 65 feet high.

The upper half of the road, will traverse for more than 30 miles, a ridge presenting throughout its course, a remarkably even profile, the average cost of grading upon which, will not exceed $3,000 per mile. This part of the route, encounters the whole of the far-famed "difficulties" presented by the "Stone mountain and its numerous spurs."

The grading and bridging now in progress, will be completed in about 15 months, and the remainder of the line can be executed, if commenced during the ensuing winter, as rapidly as the superstructure can be brought up with it.

The business of the road this year, has in the aggregate, exceeded that of last year, $23,771·31, the increase on freight, is $32,185·18, and on mails, $2,029·26, while for passengers (and some other small items,) there has

been a falling off of $10,443·13. The causes that have produced this decrease, are traceable solely to the extraordinary depression in the price of the staple of the country. The loss has been nearly uniform at all the stations, except one or two which have not fallen off, in consequence of known local causes.

It will be perceived, however, that there has been an increase in way passengers, (or those passing between intermediate stations,) the receipt from whom, this year, are more than 10 per cent. of the whole travel. The revenue from this source, for the week ending April 1, 1841, was only $3,505·30, for the year ending April 1, 1842, it was $5,256·18, and for the present year, it is $6,510, exhibiting a uniform and gratifying increase each year, notwithstanding the inconvenience which such travel is placed under in consequence of our night schedule.

Since the close of the year, our books show an increase in our receipts for both passengers and freight, over the corresponding months of last year. In up freight the gain is nearly two-fold, and it is in a great measure derived from our Tennessee and Alabama customers, who if our road is not pushed forward, will unquestionably seek another channel for the transportation of their goods.

Some efforts have been made, which have not yet proved successful, to organize a ticket by which a reduction in the rates of passage could be effected on travel going entirely through, from Montgomery to Baltimore, so as to enable us in connection with our greater speed, to compete with the boats on the Mississippi. In consequence of the numerous interests to consult, the arrangement has not yet been perfected, but it is believed that most of the difficulties have been removed, and the experiment will, in a short time, be fairly tried. The extension of the same system, through to New Orleans, would be desirable, but as there are no regular packet boats, at present established on the Alabama river, that run at all seasons of the year, a connection could not be formed, immediately, that would be satisfactory.

Our rates of freight on cotton were reduced last season, to an average of 40 cents a hundred pounds, per 100 miles. This rate, I believe, gave to us the largest nett profits that we could have derived from the crop. A lower rate would possibly have given us more business, but we could not have gained a sufficient number of bales by a further reduction, to cover the loss that would have been sustained upon that carried. Instead of future reductions to any extent, it has been suggested that we give to the customers of the road, some conditional right of passage to Augusta on more favorable terms than the ordinary travel.

It is proposed to revise during the ensuing summer, our tariff on up freights. A reduction may be made on some articles, but our rates are conceived to be, generally, low enough. There is no part of the duties connected with the management of railroads, that require as much consideration as the charges on freight. While too high rates will in a short time lessen the amount of the receipts of the road; on the other hand, a very reduced scale, may add greatly to its business, without a corresponding increase in the nett profits. A just medium is to be observed, and can only be obtained by a full knowledge of the nature of the transportation expected, and the sources from whence it is to come, together with the controlling circumstances calculated to divert its passage from over the road. The knowledge obtained on this subject, during the time the road has been in operation, we trust will enable us to fix a scale which will give satisfaction to our customers, and at the same time, meet the paramount interest of the stockholders.

The following summary statement, will show the business of the road,

and the expenses incurred in working it, during the year ending on the 31st of March last. The usual statements giving the business and expenses in detail, will be found among the papers accompanying this report:

Cr.

By amount for passengers up,		30,637	84	
" " down,		31,297	46	
" " extra trips, extra baggage, lots of negroes, etc.,		1,105	51	
" " freight up,		69,591	43	
" " " down,		84,574	07	
" " " between stations,		725	15	
" " premium and rents,		913	00	
" " transportation of mails,		29,182	48	$248,026 94

Dr.

For expenses of conducting transportation,		25,170	02	
" " motive power,		30,220	34	
" " maintenance of way,		44,684	34	
" " " cars,		9,744	37	109,819 07
Leaving nett profits,				$138,207 87

Our contract with the post office department has been renewed, at the same rate of compensation per mile, received under the old agreement, commencing the new service on the 1st of July next.

We proposed to transport the great mail, starting from either end of the road, at such hours as the department might designate, at an average speed at night of 11 miles per hour, for the annual compensation of $300 per mile, or at $237½ per mile, leaving Madison at 3 P. M. The first proposition was rejected, on the ground that the funds of the department would not justify an increase in railroad compensation, beyond the old price, ($237½ per mile,) and the second was finally acceded to, by changing the hour of starting from 3 to 5½ P. M. By the completion of our road to Covington, however, we shall be able to change the schedule so as to reach Augusta before midnight.

The decision of Mr. Kendall, in relation to railroad mail compensation, was to allow $237½ per mile, to such roads as surrender the control of their hours. The present post master general, has so far deviated from this rule, as to allow this price to all railroads on the great mail route, indiscriminately.

Under this arrangement, the S. C. C. & R. R. Co. receive for a day schedule of only 13½ miles per hour, the same rate allowed to us, for night service both ways. In Mr. Kendall's decision there was some fairness, but in the present, there is none.

Under the schedule adopted between Washington and Madison, the mails will arrive with much more regularity than formerly. If failures occur, they must arise chiefly from the late arival of the boats at Charleston, which could be prevented in a great measure, by a later hour of departure of the cars from that city; there being ample time west of it. In fact, many of the failures which have heretofore taken place, may very properly be placed to the account of the S. C. R. R. Co., whose adherence to an early departure from Charleston, has been an important cause of the derangement in the line, and a serious inconvenience to their neighbors, which will be only partially overcome by their consenting to leave at 9 instead of 10 o'clock A. M.

Our motive power has been greatly improved, and it is now capable of performing 50 per cent. more work than we have at any time had occasion

for. Under these circumstances, I did not hesitate to embrace an offer from the State of Georgia, to purchase from us the locomotive Florida, which has since been delivered upon the Western and Atlantic railroad.

Although the distance run (152,873 miles,) by all the locomotives during the year exceeds that of the previous year, only 353 miles, yet we brought down with them 23,000 more bales of cotton, showing an increased efficiency in their performance, of 50 per cent., which however, is partly to be accounted for, from the circumstance of being able to obtain more frequently, full loads. The expenditures in this department, notwithstanding the improvements of machinery, which are still progressing, is but $30,220 34, about the same as last year. The ordinary repairs of engines, were $7,790 90, and extraordinary repairs, but $76 00, the last occasioned by an accident to the night line. The saving in this item, compared with that given in previous reports, exhibits clearly the advantages of a slow speed for freight, and a fixed schedule to run to by freight, as well as passenger trains.

One of our small locomotives, (the Tennessee,) has been altered to Baldwin and Whitney's patent 6 wheel freight engine, and now weighs about 11 tons. It ran but a few trips, after it was received, before it met with an accident, caused by the weakness of the shackle pins, which are being repaired by the patentees, upon a more substantial plan. The performance of the machine while running, was entirely satisfactory. It drew up our steepest gradient, 37 feet per mile, a gross load of 240 tons, exclusive of engine and tender. This improvement if successful, and I now entertain but little doubt on the subject, will be of great importance to railroad companies, especially to those who have laid down the ordinary plate rail.

We have erected an iron foundry adjoining our machine shops, which has been leased for an interest on its cost, under a contract with the individual renting it, to execute our castings at 1½ cents per pound. By this arrangement, we get our old wheels converted into new ones, for about $7 00 each, which will effect a considerable saving in our future outlay for cars. We have succeeded in giving the wheels as deep and uniform a chill as those obtained from the best manufactories at the north.

The expense of maintaining the road, has according to our expectations, been greater than any previous year, and probably will not again reach the present amount. Next year it will be considerably less, if nothing extraordinary should occur. The average cost per mile, is $303.

The accounts for next year, will exhibit a considerable saving in all the branches of the business of the company, owing to the reduction in the price of labor, provisions and materials, together with the improved condition of our machinery.

Our nett profits this year, are about 6 per cent. upon the cost of the *whole road*, and I cannot think that they will, at any time, be much less than this rate. The returning prosperity of the country, would lead us to hope that they would soon greatly exceed it; a hope which is only clouded by the anticipated interference of rival improvements.

Respectfully submitted by your obedient servant,

J. Edgar Thompson,
Chief Engineer and general agent.

Statement of the Yearly Expenses incurred for working the Georgia Railroad, from April 1, 1839, to April 1, 1843.

	Year ending April 1, 1840.		Year ending April 1, 1841.		Year ending April 1, 1842.		Year ending April 1, 1843.	
CONDUCTING TRANSPORTATION.								
Stationery and printing,	589 55		475 04		777 56		585 69	
Loss and damage,	1,666 93		738 67		1,909 18		382 34	
Incidentals,	1,101 31		883 45		1,624 68		1,866 08	
Oil and tallow for cars,	288 61		182 78		402 72		410 97	
Provisions, clothing, etc., for negroes,	4,041 57		2,593 98		2,849 42		2,862 07	
Expenses of mules, Warrenton branch,	360 25		799 43		1,062 62		591 10	
Expenses of horse car, Athens branch,					583 34		2,336 33	
Wages, laborers,	4,522 59		2,355 11		2,022 24		3,958 23	
Agents and clerks,	7,467 89		7,356 39		8,742 88		9,329 42	
Conductors,	3,927 81		2,484 75		2,024 83		2,663 79	
Work done by car factory,					220 50		152 50	
Work done by machine shops,					480 00		31 50	
		23,966 51		17,869 60		22,699 97		25,170 02
MOTIVE POWER.								
Stationery and printing,	59 17		16 25		13 08			
Expenses of water stations,	3,009 40		2,480 98		2,518 11		2,061 12	
Incidentals,	70 82		27 95		329 49		184 62	
Fuel,	6,839 24		5,402 87		7,186 61		6,405 12	
Oil and tallow for engines,	3,108 84		1,177 54		1,538 73		1,411 34	
Ordinary & extraordinary rep's to eng's,	6,403 38		6,792 19		9,610 28		7,866 90	
Improvements to engines,							2,288 00	
Engine drivers and firemen,	7,523 73		4,715 13		7,079 33		7,151 14	
Provisions, clothing, etc., for negroes,	1,503 59		2,039 97		1,735 42		2,852 10	
		28,518 17		22,652 88		30,011 05		30,220 34
Carried over,		52,484 68		40,522 48		52,711 02		55,390 36

Statement of the Yearly Expenses incurred for working the Georgia Railroad, from April 1, 1839, to April 1, 1843, (Continued.)

	Year ending April 1, 1840.		Year ending April 1, 1841.		Year ending April 1, 1842.		Year ending April 1, 1843.	
Brought forward,		52,484 68		40,522 48		52,711 02		55,390 36
MAINTENANCE OF WAY.								
Mens' wages,	12,514 12		12,103 67		19,549 58		18,322 73	
Supervisors,	1,999 94		1,699 96		1,733 29		2,724 23	
Provisions, clothing, etc., for negroes,	2,174 69		1,592 35		2,703 06		1,764 62	
Incidentals,	229 26		180 49		524 99		809 49	
Tools,	414 07		377 56		826 99		399 78	
Iron and spikes,					550 47		1,969 66	
Wooden rails and cross ties,	1,401 17		5,446 38		11,382 80		16,046 74	
Repairs of culverts,							376 88	
Work done by car factory,			436 20		511 16		795 70	
Work done by machine shops,					910 17		1,474 51	
		18,733 25		21,836 61		38,692 51		44,684 34
MAINTENANCE OF CARS.								
Ordinary repairs,	4,936 30		4,725 20		3,660 00		2,144 37	
New baggage car,							1,050 00	
Renewal of wheels,					1,167 50		3,098 63	
Renewal of Axles,							351 37	
New platform car,							2,500 00	
Extraordinary repairs,	480 00		189 15		1,287 00		600 00	
		5,416 30		4,924 35		6,114 50		9,744 37
		$76,631 23		$67,283 44		$97,518 03		109,819 07

For the American Railroad Journal and Mechanics' Magazine.

ON A NEW APPLICATION OF RAILWAYS.—BY ELLWOOD MORRIS, CIVIL ENGINEER.

It is well known that prior to the introduction of the modern railway system, cities were chiefly furnished with provisions, from a space covered by the revolution of a very limited radius, whose length was determined by the distance which horses could travel within a few hours; while but very moderate supplies indeed, were ever drawn from a greater distance than a days' drive.

An immediate result of the greatly augmented speed of travel, consequent upon the construction of any modern railway leading from a city into the interior of the country, is a direct and considerable extension of the surface, capable of becoming with advantage, *tributary to the market of that city.*

The large augmentation of the surface of production, tributary to any market consequent upon a diminished cost and increased speed of transport, must inevitably have an effect upon the value of provisions there, and it will follow hence, that whenever the railway system shall be properly availed of for the supply of our cities, the selling prices of country produce in their markets, *must fall*, and their numerous inhabitants be thereby benefited.

This is but another phase of the important economical revolution, which the great iron roads of modern days, are gradually producing, in all that is in any way dependent upon the cost or time of carriage.

Upon the European railways, the highest advantages seem to have been derived from the facilities they furnish for the cheap and easy carriage, from great interior distances, of live stock and other provisions destined for the supply of the overgrown communities there assembled in the great cities.

Even in our own country their influence in the aspect referred to, is begining to be strongly, as well as beneficially felt, and one railroad corporation at least, has profited considerably by the establishment of a market train, regularly drawn, like other freight, by locomotive steam power.

We refer to the Camden and Amboy railroad company, the directors of which, in their elaborate report of 1840, upon the completion of their works, describe the success that has attended the establishment of a regular market train upon their railway, which has been the means of opening for the supply of the provision market of New York, a large district of country, practically inaccessible before.

In the report referred to, at page 11, we find the following statement:

"Two years since at the request of some market people in New Jersey, a line called *the pea line*, with two cars, was occasionally started from Camden to New York, with no other view or expectation than the accommodation of a very useful and respectable class of men. This line has steadily increased until it has become profitable beyond all expectation. During the past year, it has been running daily, sometimes taking with it as many as sixteen cars, laden at the appropriate season with peas, peaches, potatoes, as-

paragus, cabbages, live stock, and upon one occasion (as incredible as it may seem) *thirty tons of green corn!*"

The European railroads have been found extremely beneficial in the transportation of live stock, and other provisions to the great cities, which have thus been enabled to draw their supplies from a much larger surface of country, and consequently at a smaller price.

Since the completion of the Baltimore and Ohio railroad to Cumberland, extravagantly high prices can no longer be commanded for agricultural products on sale in the Baltimore markets; thus with the article of *butter*, it has been recently observed that whenever it becomes unusually high, large quantities are promptly sent down by the farmers beyond Harpers Ferry, and prices fall at once.

So strong indeed is the influence of this railway in regulating, and keeping down to a moderate standard, the market prices of Baltimore, that it has already become a subject of complaint, with those who, from the nearness of their position, have heretofore been able to hold a monopoly of the supply.

Other facts might readily be adduced, which in connection with the remarkable experience of the Camden and Amboy company, would show in a striking light the advantages which must follow the introduction of market cars upon railways, and will ultimately among other results, tend to soften the prejudices still entertained by some against railways as aristocratic monopolies, since by reducing the cost of the necessaries of life to all, they will recommend themselves in the strongest manner to a large majority of our population.

With the introduction of market trains upon railways, *provision depots* become desirable, and the first of these which has fallen under the notice of the writer, where provisions brought in railway cars are kept on sale, both wholesale and retail, is that lately erected in the city of Philadelphia in connection with the Columbia railroad, and opened in June of this year, under the denomination of the *car market.*

It is this new application of railways—*to the formation of a railroad market*—that it is proposed briefly to describe.

The idea of constructing a *railway market*, having been for some time entertained by Mr. Samuel Webb an intelligent and enterprizing citizen of Philadelphia, who foresaw the advantages that must flow from the transportation of provisions by the railways centering upon that city; he applied to the writer during the past year, to work out the practical details, and superintend the construction of *a car market house*, of which he furnished the outline.

This building has accordingly been erected; it was opened to the public in June last, and promises to be very successful.

The *car market* is 200 feet long, and 40 feet wide, it fronts on Schuylkill Seventh street north of Callowhill, its axis being parallel to the State railroad leading to Columbia, and 130 feet distant from the southern sideling.

In consequence of the position of the building, it was necessary to enter

it through the north flank by reversed curves, with a short tangent between: this is effected by turning out of the Columbia railway to the right, upon a curve of 80 feet radius and 51½° deflection, into a tangent running off obliquely at that angle; thence by this tangent 90 feet, and then by another curve of 80 feet radius and 51½° deflection, turning to the left we curve into the axis of the market house.

Through the centre of this building longitudinally, from end to end, a straight track of railway is laid, and to enable the empty cars to pass out without interference, a return track is provided, which by a radius of 48 feet turning 128½° of curvature, re-enters the oblique tangent before mentioned.

All of these curves are laid with a common railway superstructure, and though their radii are so very limited, they nevertheless answer their purpose satisfactorily.

The writer will here observe in passing, that for the ordinary entrance tracks of depots, a common railway superstructure, where all the wheels run upon their treads as usual, will answer very well when curved upon a radius of 80 feet, and of the numerous side tracks recently laid here, to accommodate the coal trade descending the Reading railway, nearly all the curves are ordinary railroad tracks, and in some of them radii of curvature of less than 80 feet, have been adopted without inconvenience.

The car market is near 37 feet wide in the clear, and the stalls are made to project out 8 feet, at every 16 feet lineal of the walls, forming recesses between, and leaving a central promenade of 21 feet wide, entirely unincumbered, except by the pillars which carry the second floor.

This arrangement allows ample space for purchasers, even when the central railway is filled with cars, and by means of the projecting stalls, furnishes a great developement of stall surface, for the exposure of provisions on sale.

The building is of stone, two stories high, and the second floor is destined in the course of time, to be also used for the sale of the lighter articles of marketing, which, brought to the market in cars, will then be elevated to the next story, by some convenient means.

Such is the outline of an enterprize which will probably form a prototype for others on a more extended scale, *since the idea acted upon seems to be a sound one, and must eventually have a very important effect, upon the provisioning of those cities, which by their railways, command the interior country.*

RAILWAY COMMUNICATION BETWEEN PARIS AND THE NORTHERN PORTS OF FRANCE.

By the politeness of Mr. Joseph E. Bloomfield, we have received a copy of the report of Mr. Robert Stephenson to the directors of the South Eastern railway. The valuable information to be found in this document upon one of the most important lines of railroad in Europe, has induced us to give an abstract of portions of Mr. Stephenson's report.

In 1835 under the direction of the French government M. Vallee ex-

amined the whole of the northern lines of railway and reported fully thereon. The lines recommended by M. Vallee contemplated a route direct to Amiens and thence two diverging lines, one to Boulogne and another to Calais—two points of union with the Belgium railways were likewise indicated. Under the arrangements then proposed by government, negotiations were made with a Mr. Cockerill which were finally abandoned on account of the inadequate aid offered by the French government.

"The plan recently proposed by the minister of public works, and approved and authorized by the Chambers, consists of bringing the funds of government in aid of private enterprize, and should fair and equitable terms be obtained from government, there cannot be a doubt that such an arrangement will prove highly beneficial to the individual as well as to the country at large.

"The outline of the government proposition is this:

"They engage to purchase all the necessary land and construct the whole of the earth-work, bridges, and stations, leaving to the company the execution of the upper works of the railway, that is to say, laying the rails, chairs and ballasting, and to supply the whole of the carrying establishment, viz. locomotive engines, wagons, etc. For this expenditure the company are to work, and have the entire profits of the working of, the line for a given number of years; at the expiration of which, on the purchase of the then existing stock at a just valuation, the government become the sole proprietors of the railway. It is further proposed, that if the company prefer executing the earth-work, bridges, etc., leaving solely to the government the purchase of all land required for the works, and the construction of the stations, the government will pay to them such sums as may be calculated to afford an ample profit for the execution of these works. The company will possess the entire control of the undertaking from the commencement, subject only, of course, to such laws as are expedient for the establishment of public security, and the maintenance of the public welfare. The lease, under these conditions, would, of course, be limited as before, and at the expiration of it the government become possessors upon the same terms."

The remarks of Mr. Stephenson upon the singular restrictions imposed upon M. Vallee are of sufficient professional interest to be given somewhat at length.

"Before taking up the detailed examination of M. Vallee's plans and sections, it is necessary that I should allude to one or two of the engineering instructions, which he appears to have received from the French government, and under which he seems to have acted in almost every case, and in many, if we may conclude from the tone of his remarks, against his own judgment.

"The restrictions I refer to are—

"1. That no curve should be made under 1,200 metres in radius.

"2. That no gradient should exceed 3 in 1,000, or, as it is expressed by English engineers, $\frac{1}{333}$, or about 16 feet a mile, and

"3. That all curves of small radii should be level.

"In deputing an engineer to examine a tract of country extending from Paris to Belgium, and to the ports lying contiguous to England, and embracing several marked and difficult physical features, it were hard to conceive instructions better calculated to fetter the free exercise of his judgment and prevent the results of his survey being practically useful, than those just laid down.

"Those instructions would no doubt compel him narrowly to study every feature of the face of the country, for with limitations of this kind, the designing a line of railway over so extensive a district, must necessarily prove a matter of extraordinary difficulty; indeed, so distinctly has this proved to be the case, that, in some of the lines laid down by M. Vallee, he has been driven to the necessity of abandoning, in a few instances, the letter of his instructions; and, in the projected line between Etaples and Boulogne, the increase of work occasioned by an adherence to his instructions, has been of so extensive and glaring a character, that he has felt himself called upon to allege two untenable reasons for that adherence, namely, the short distance along which the difficult features present themselves, and the necessity of decreasing the load of every train on its approach to this incline, should he establish it at 5 instead of 3 in 1000; in fact, such deviations have only been applied to the sections, where the surface of the country actually defied the application of the government regulations, except by the adoption of such expedients, as would have appeared, when developed, obviously preposterous. The nature of the country having in such cases proved unmanageable under those restrictions, and consequently having thrown the engineer upon his own resources, it is to be regretted, that throughout his examination he did not keep sufficiently in view, and more frequently and specifically point out in his report, the results which would have attended any other mode of treating the section of country, which the line was proposed to traverse; on the contrary, he seems even to have alluded to a deviation from the strict conformity with his instructions only when the nature of the surface rendered it imperative to do so, but wherever a given summit was to be encountered, and it proved to be within the scope of the specified gradients and other conditions, the line was designed in accordance with them, without apparently any, or at most, very little regard being paid to the question of expense, or a consideration of those unforseen contingencies, which works of magnitude, such as those shown upon his section, must inevitably entail, and which have universally occurred within the experience of every engineer." * * * * *

"I have stated that it was difficult to conceive restrictions more calculated to fetter an engineer in such a gigantic task, but it is still more difficult to devise a cause for the French government having originated such regulations; they could not have derived them from any railways in their own country, for both the lines from Paris to Versailles are direct contraventions of them; they could not have deduced them from the Belgian practice, neither could they have formed a basis in the engineering experience in England, for here they would have learnt, that each case was treated as the local circumstances dictated.

"It is true that engineers may and do differ respecting the precise mode of meeting the natural difficulties which may present themselves in the projection of a railway through a long extent of country, and that they differently estimate the comparative advantages and disadvantages of what are termed good and bad gradients; and though I appreciate more highly than the generality of the profession the ultimate benefits which I believe will always be found to spring from the use of favorable gradients, yet I cannot but feel, and that very strongly, that the application of precisely the same principles as those which governed me in designing the London and Birmingham railway to the section of country now under my consideration between Paris, Belgium and the Northern coast, must lead to consequences which the government and every interested individual would hereafter have reason to lament; and I should not be fulfilling my duty as a member of a

scientific profession were I not at once to avow my conviction of the injurious influence of circumscribing the free exercise and application of professional experience within the contracted limits of a code of specified instructions, which, while they fetter design, must entail expense and inconvenience in the execution."

The exorbitant cost to the government for the construction of the lines located upon these principles, is likewise adduced as a reason for their abandonment. Mr. S. however, remarks, that there appears every disposition on the part of the government to entertain a proposal somewhat modified, to meet his views of the case.

Public convenience and accommodation, have influenced the government in ordering an independant station at the point of departure from Paris—as a negotiation with the Messrs. Rothschild failed in consequence of these gentlemen, influenced by their large interest in the Versailles railway, having made it a *sine qua non* that there should be a common station. The same praiseworthy regard for public accommodation, has in several cases, ordered the carrying of the road, even at an increase of length, through some of the more prominent towns and manufacturing districts, and this the report deems favorable rather than otherwise to the interests of the contracting parties as insuring a larger traffic.

The line proposed, after leaving Paris reaches the valley of the Oise at Pontoise and follows it for a distance of 23 miles to Criel where the valley of La Breche, a tributary must be taken. At this point the absurdity of the restrictions above mentioned is shown. Instead of adopting the favorable low ground, the line would be compelled to ascend gradually, occupying the rough sides of the valley and encountering continual difficulties. The report advises an adherence to the low ground and at the summit a grade of about 1 in 150.

At St. Just, the sudden rise in the cliff involves heavy work, upon any plan. The line then descends to near Amiens, and as this town is ordered to be one of the points, a short branch to it is proposed—a population of 60,000 will amply repay this additional expenditure. Between Amiens and Arras on the Scarpe a difficult and elevated country is encountered for 40 miles. Here again the restrictions imposed would have produced a costly and inconvenient location. At Douai a branch to Valenciennes meets one of the Belgian lines, and further on another branch makes another union at Lille. This part of the line and its branches embraces a valuable traffic through a wealthy coal region.

The main line passes over favorable ground nearly along one of the old canals to Calais, a branch is also proposed to Dunkirk.

Mr. Stephenson prefers the line to Calais instead of one to Boulogne, although the passage from Dover to Paris would be about two hours shorter by the latter—but the connection with the Belgian roads and the traffic already existing are more powerful considerations than this saving of time. It is evident that the travel to the Rhine and generally to the whole of the

northern part of the continent would pass over this line, while the whole of the Paris and southern travel will in addition to a vast local business furnish a very handsome return for the investment.

The cost is estimated for the whole distance 255½ English miles.

Excavation, bridging, etc.,	£2,390,598
Land and stations,	1,062,488
Permanent road,	2,124,976
Carrying establishment,	531,244
Total,	£6,109,306

According to the proposal, £3,076,668 of this is to be paid by the company, the remainder by the government.

The investigation of the cost of construction embraces several very useful tables, which at some other time we may again refer to. The consideration of the existing traffic shows an amount of labor very unusual in such documents and although somewhat of local interest is yet valuable as demonstrating the vast importance of railroads leading to great cities and the profitableness of the investment. As one instance of the importance, even of trifles on such a line, we find that the income at present derived from the transportation of *fish* along the proposed route, *is* over half a million of francs, annually, and for sheep and cattle still more.

We are pleased to find that the views of Mr. Stephenson are so strikingly in favor of the greatest amount of accommodation as conducing to the profit of the capitalist—while the low fare ordered by government, he in some cases proposes to reduce still more.

New York is not so large as Paris, but it *is* a large city and the country around *does* pour in a vast and profitable traffic—but we have yet no New York and Albany railroad to facilitate this traffic or reap the profit.

The following sensible and timely communication will please most of our professional readers by its pungent and yet civil criticism upon a common and shameful disrespect to engineers. We have frequently spoken of the folly of entrusting the management of a completed road to other than professional men; we have also referred to the assumption of engineering duties by directors—together with the bad effects of this amateur engineering. Our correspondent has, however, opened upon another and no less absurd practice and we hope that together with the promised communication upon the Portland road, he will furnish us with more notices to the same purpose.

The conduct of engineers in not asserting their own respectability, in a great measure is the cause of this and similar evils, and any attempts at a reformation are to be considered as promising, if they emanate from engineers themselves.

For the American Railroad Journal, and Mechanics' Magazine.

Messrs. Editors:—As one of the objects of your valuable Journal, is to promote the interests of engineers, a class of professional gentlemen, whose services have been considered important in connection with the construction

of public works, will you allow a few remarks, and extracts, showing how readily directors assume to themselves all of the results of engineering.

The report of the directors of the ***Portland, Saco and Portsmouth railroad***, submitted at the annual meeting of stockholders in June last, happens to be the most convenient case for reference; and firstly, to show in what manner the character of that road is regarded by the directors, observe the language of the following extract:

"The obstacles that have arisen from the sinking of the embankments in some two or three places, to a depth seldom, if ever, before known, and the method taken to obviate, or surmount them, were then, (*in a previous report*) adverted to, with a hope expressed, that the latter might prove successful. That hope has been fully realized. The heavy freshets occurring at the moment when the frost was breaking up, having fully tested them."

And, after showing the nett income for six months, they say—

"This is the produce of five months winter, and one of cold weather. The stockholders may surely look forward to better things. The character of the road, shown in the solidity of the embankments, the strength of the masonry, the design and workmanship of the bridges, the form and weight of the rails and the mode of supporting and connecting them, the length of straight lines, the radii of the curves and the ease of the grades, together with the superiority of the passenger cars, and the efficiency of the locomotives, employed, ought to give satisfaction to the travelling public, whose security and accommodation have been the first objects aimed at in its construction and the manner of conducting it."

These prove that the directors are far from dissatisfied with the road and that they view it as a permanent work, and if it were not for one or two mere allusions to an "engineer department," and to "engineers," in the report, very elaborate and satisfactory as it is on other points, one might suppose that the road came into being by some magical power emanating from the directors. After refering to "various surveys," and to the report of June, '41, they add, "The plan then adopted for the engineering department and the system of accounts then devised * * * have all proved effective and satisfactory;" and again, adverting to certain bills rendered by the contractors they say these "cannot be adjusted until the returns of the engineers have been examined and approved."

And lastly, an important piece of information is given, to wit

"The engineer department has been nearly or quite settled up—some small additions may be required for services in settling the accounts with the contractors."

Perhaps some one can state who these "engineers" were to whom these passages refer, and the writer leaves that question to be answered from other sources—but a few facts, known to him, may serve to show, if not inconsistent with what has preceded, that there are various circumstances connected with the road which reflect a little credit on these "engineers."

The cost of this road when prepared for the probable amount of business, including about $64,000, paid stockholders for interest on assessments, will not exceed, "much if any, the original estimate, of about $23,000 per mile."

The expenditures, to Jan. 1st, '43, were, including interest, $1,107,240 16. The length of the road from the centre of the Piscataqua river, at Portsmouth, N. H., to the depot in Portland, is 50 miles 3093 feet. The surveys were begun January 1st, 1841. The contracts were made for the entire distance on the 1st April following. The topographical examinations and the location, were consequently made within the three worst months of the year. One line was located, passing through York, east of Mount Agamenticus, Wells, Kennebunk, Saco, to Portland, and another, which was subsequently adopted, diverging westerly from the first, at the Piscataqua, and passing through Eliot, South and North Berwick, west of Agamenticus, joining the first named, about 35 miles from Portsmouth. Thus making some 86 miles of actual location, to accomplish which, in a part of the country requiring the most careful surveys, even at the most favorable season for examinations, much time and labor were of course expended on primary lines, exceeding by far, in this as in most cases, the length of the line of location.

In ten months from the letting of the work, 13 miles, and in twenty months, the 50⅜ miles have opened for travel—crossing the deep and rapid Piscataqua, by repairing and improving the old bridge, and connecting, at Portsmouth, with the *Eastern railroad*, thus making a continuous line of road from Boston to Portland, about 104 miles, and on the 14th January, 1843, the engineer department was dissolved by the resignation of the gentlemen of whom it was composed.

There are other points connected with this road which might interest your readers, and in the hope that some one will yet go somewhat into the details, the writer has the more readily passed them by—his object is rather to protest against the unmanly course so prevalent among directors of public works, of hiding as far as possible, any allusions which may let stockholders know to how great an extent they are indebted to engineers, not only for the successful construction of the works in question, but for the very materials of the reports themselves.

ACCIDENTS UPON RAILROADS.

Our last number contained a notice of several recent railroad accidents together with some pretty severe remarks upon the culpability of those who allowed such accidents to occur. One of the editors having received the impression that one of these catastrophies had not been the result of gross carelessness on the part of the company and that many of the articles in the public prints had been written in ignorance of the facts and in a very improper spirit. With this view of the case, a notice was prepared, but during an absence from the city, facts came to the knowledge of the other editor in regard to this and to other accidents, which gave occasion for the article which finally appeared. Since then we have understood that in one of the cases alluded to, erroneous statements were promulgated. We refer to the collision on the Reading railroad, which, it appears, was the result of direct

disobedience of express order, and not to any fault of the company or its superintendant, Mr. G. A. Nicolls. It is but an act of justice to Mr. N. that this correction should be made, for we should feel great regret that any notice in this Journal, directly or indirectly could be construed into an unjust criticism upon the conduct of so worthy and efficient an officer.

No harm has been done, however, by the discussion, which has been the means of eliciting the truth and of opening the eyes of companies and their agents to the necessity of an official organ through which to communicate to the public a correct statement of facts. If we are compelled to draw our information from the newspapers, we of course, must be influenced by the facts as we find them given—but if upon such occasions we receive our account directly from the company—by means of our various exchanges, correct statements can be afforded to the public and with an authority which cannot be given as things are now arranged.

Among the various notices which have appeared, our attention has been drawn to a series of communications in the Baltimore American over the signature T. These seem to us to convey very just views and to embody much information. Extracts from them will be found on another page.

The following extract of a letter from a London correspondent to a friend in this city, will prove interesting.

London, May 19th, 1843.

My Dear Sir:—Thinking you may feel an interest in the report made by the celebrated engineer, Robert Stephenson, on the projected railway from Paris to Lille and Vincennes with a branch to Calais, (the whole distance about 256 miles) I send it to you by the present conveyance. It contains much interesting matter, and I hope will prove of interest to you. I should be glad to hear from you respecting the prospect of your getting on with your magnificent scheme from New York to Albany. It appears to me, this is a work of such paramount importance to the city of New York, since the completion of the whole line of railway from Buffalo to Boston, that sufficient enterprize will be excited to complete it. Let me hear as soon as you can conveniently. I have read many of your statements in the American Railroad Journal, as well as in separate pamphlets, and I am thoroughly convinced that this work if properly made, must be of extraordinary advantage to the community, and of great pecuniary advantage to the proprietors of the stock. A rival work on the shore of the Hudson ought to be deprecated by any well-wisher of the prosperity of New York. Both works cannot be supported, and bringing forward this new scheme will probably prevent either from being made. What is doing with this new project—is it given up, or do you feel any danger from it?

I observe by the newspapers that the legislature of your State has granted new facilities to the New York and Erie railroad company, which will probably enable them to finish this gigantic work. Ought not your concern and this great concern and all others in the United States interested in ma-

king railroads, to unite in trying to get congress to abolish the extravagant duty of $25 per ton, on railway iron? This duty is more than the first cost of flat bar railway iron, and not more than $3½ excess over the first cost of edge rails free on board at Cardriff or Newport! A duty of 100 per cent *ad-valorem* on an article of such importance in promoting the prosperity of our common country, and which cannot be made in America, does not show a very enlightened and patriotic policy in our government. I doubt not if the proper efforts be made that congress at its next session will abolish this unreasonable and impolitic tax.

ACCIDENTS ON RAILROADS.

Messrs. Editors—The frequent accidents on railroads, arising from collisions with cattle upon the track, is imminently perilous to human life, and ought promptly to attract the gravest attention of those in authority. There is, perhaps, no branch of our State police which better demands legislative interference, or which, in all previous attempts to deal with it, has been more misapprehended. In all countries the care and improvement of *highways* are important objects of public concern, and in their management in every well regulated community the convenience and safety of those having occasion to use them are deemed of paramount necessity. It is obvious that railroads have worked essential changes in our system of highways, and that little has yet been done to adapt the laws to the new order of things. * * It is apparent that those immediately engaged in railroad opperations have a deeper interest in their regularity and safety than any one else; for not only are the consequences, in case of accident, vastly more serious to them than to other common carriers; but, besides the risk incurred by the immediate agents, in common with the lives and property committed to their care, the most ordinary accident, arising from any cause whatever, can seldom happen without involving a loss to the company much greater than any amount of their daily profit. Although this should not dispense with the strictest regulations to ensure proper care and precaution from the parties concerned, it may well dispose the legislature to contemplate other sources of danger which due care upon the part of the companies or other agents cannot possibly guard against; and we think the unlimited trespassing of cattle upon the track of a railroad presents a principal source of hazard, for which an adequate provision has not yet been made.

We presume that, according to the universal principles of law, if any one suffer damage from the want of proper care by the agents employed, the companies would be liable. In this State, too, special legislative enactments have been made not only in aid of the charters and of the rule applicable to other carriers, but creating new responsibilities and imposing additional penalties unknown to the common law. It may be hoped, therefore, that as far as the companies are concerned these are sufficient to attain all that the laws can reasonably enforce.

It is understood also that the managers of most, if not all the railroad companies, have co-operated with the law makers in these commendable efforts; that they employ the fullest complement of agents of known sobriety and competent skill, and at the highest rate of wages; and exact the performance of their duties by the strictest contracts and severest penalties. It is believed also that they have at considerable expense established a supervisory force along the line of their roads to keep off cattle and look after other obstructions; and, as far as the curvatures of the road will admit of it, have

placed upon the machinery the best contrivances which have yet been discovered, for the purpose, in case of accident, of protecting as far as possible the passengers and property.

The legislature has shown too that in their opinion something is due from the public to the safety of the lives and property passing over these new description of highways. They have accordingly prohibited all persons from riding on horseback, or riding or driving or leading any horse or horses, mule, oxen, carriage, wagon or other vehicle, or any cattle, sheep, hogs or stock, upon or along any railroad; and "to protect the lives of persons travelling on railroads within this State," they have made it felony in any person to place or cause to be placed on any railroad anything calculated to obstruct, overthrow or divert from the track any car passing on the road with the view or intent to obstruct or overthrow any car, and they have declared that if death ensue from any such obstruction, the person placing or causing it to be placed upon the road shall be guilty of murder. All these provisions, however, relate to intentional offences, or to crimes of such deep atrocity as, it may be hoped, will seldom be committed; leaving wholly unguarded those sources of danger, which though they may proceed from no criminality are of daily occurrence, and not less perilous. To what end, it may be asked, are railroad companies made, as unquestionably they should be, strictly responsible in case there should be any want of care in avoiding obstructions found upon the road, if no means be taken against placing such obstructions upon it, *intentionally* or *otherwise?* The *safety* of the *passenger* requires that *he* should be protected not only against the negligence of the railroad agent in running over an animal on the track, but also against that of the owner who carelessly permitted the animal to be there—and this protection the law should afford him.

The question is not between the railroad companies and the public; nor whether this or that degree of care upon the part of agents of these companies is sufficient; for all that is possible for these to bestow should be and is already exacted with the utmost severity. The real question is, in what manner the safety of the lives and property of the citizens passing over railroads can be best promoted, and by what means those causes most likely to produce mischief may be prevented. * * * *

It is notorious that most accidents upon railroads are produced by collisions and cattle trespassing upon the track; and, from the fact that these casualties are happening upon all roads, in all parts of the Union, and under every system of management, it must be evident that in the nature of the case where the obstruction is found, the collision is inevitable. Who, indeed, can suppose that an engine driver, or other agent, would risk not only his place, but his life, or limb (the latter in his condition important almost as his life) by needlessly running his engine into an animal found on the track?

The rate of speed usually maintained on railroads, and which without such obstructions as we are treating of, may be maintained with greater safety than can be relied upon in the ordinary conveyances (as is satisfactorily shown by the minutest inquiry by a commission instituted by the house of commons in England,) is one of the chief purposes of these improvements, and any attempt to limit the speed at a rate at which an engine and train might be suddenly checked would be destructive of these enterprizes, and consequently impracticable. Those acquainted with the operations of a railroad know that at a speed of not more than ten or fifteen miles per hour the progress of an engine attached to a heavy train of cars cannot be arrested even within the space of one hundred yards, and that attempts to do

so often produce a concussion, in itself extremely hazardous. Upon a straight line of road, ordinary obstructions may and ought to be discerned at a sufficient distance to admit of the requisite precaution, and we are not aware of any case of collision that has happened under such circumstances. But in passing curvatures, common to all roads, (often connected with steep grades, requiring such a quantity of steam, both in ascending and descending, as to render it absolutely impossible suddenly to control its power) the obstruction meets the eye of the engine driver too late to enable him by any means whatever to avoid it. It is also well known to every one at all acquainted with the subject that *cows*, especially, seldom or never show any alarm on the approach of the engine; they often get upon the road when least expected almost in contact with the train, and sometimes suddenly emerging from their concealment in the bushes on the side, pass upon the track within a few feet of the locomotive. It must be evident that in all such cases a collision is entirely inevitable; and it may be safely averred that in at least ninety-nine cases out of one hundred accidents from these animals have happened in this manner.

If any question be made upon a point of so much importance to the community at large, the legislature, by instituting an inquiry by means of a commission, as is constantly done for the same purpose by the English parliament, may readily resolve all doubt. The result, I am convinced, will make the case even stronger than I have stated it; and show conclusively that in almost every instance where cattle are run over on a railroad no human precaution could have prevented the collision.

An attempt to fence off a line of railroad from the depredation of cattle is out of the question. Even if it were reasonable to impose such upon the companies, which it manifestly is not, the numerous county roads by which the railways are intersected and crossed would render the attempt wholly impracticable. In this connection it may also be observed that all railroad companies have not only paid the full value of the ground occupied by their works, but in most instances the expense of fencing the contiguous land has been actually included in the damages allowed to the owners.

Now, if it be not in the power of railroad companies, by any degree of care consistent with the business and convenience of the public, to give greater safety to passengers and property, and there yet remain a source of imminent peril to both, should not a remedy be looked for elsewhere? Have not the public the right to demand it? Under such circumstances, we deem it the plain duty of those in authority to look to the origin of the danger, and to apply the remedy to *it*. It arises manifestly from the indifference or carelessness of the owners of cattle in the vicinity of railroads, who, instead of keeping their stock within proper enclosures, turn them out in the morning with a clear knowledge of the fatal mischief they may occasion at any hour of the day; or, what is even less excusable, turn out their herds at night, not only with the same knowledge of the danger they occasion to others but with a much stronger probability that before the dawn of day they may prove the immediate and unavoidable cause of the most fearful destruction of human life! What state of circumstances can justify a longer toleration of such use of a man's property? Should it not require a case of extreme poverty, or other urgent necessity to warrant any man to claim the privilege of supporting his cattle on the public or turning them out to do what mischief they may, at the hazard of such consequences? The just, humane and most effectual remedy, then, would be to prohibit the owners of cattle from allowing them to range at large in the vicinity of railroads, and to require that all cattle in such situations be kept within proper enclo

sures. It is in the full persuasion that no other remedy will prove effectual that I have ventured to trouble you with this paper, I am by no means insensible of the apparent hardships with which such a general regulation may be supposed to bear upon a few indigent persons; though I am not willing to concede that salutary laws of general necessity should be dispensed with because they may give rise to cases of individual hardship. It is not from such cases, however, that the great mischief of which I am treating is to be apprehended. If only the cattle of a few poor persons were allowed to range unrestrained in the vicinity of a long line of railroad the danger would be by no means so imminent, nor the necessity of the particular remedy so urgent. The chief source of mischief arises from the too prevalent and negligent practices of a very different class of our population; who, with ample means to provide for their stock, leave their fields unenclosed, or turn out their cattle upon the commons and in the highways, as reckless of the consequences as if the danger from trespassing upon railroads did not exist. It is by these means that herds of cattle are every where wandering by the line of railways, obstructing the track, and daily occasioning collisions frightful to all, and, in many instances, fatal to many whose business obliges them to use that mode of conveyance.

Now although these practices might have been deemed harmless, and therefore tolerated, in a different state of things, we think it only reasonable that having proved to be of most mischievous tendency under our present system of public improvements, they should now be prohibited and discontinued. .

But, Messrs. Editors, I have already extended this article to an inconvenient length, and will close it. My present purpose is accomplished, in calling public attention to an evil of serious magnitude, and indicating what I consider the appropriate remedy. At another time, I may follow up the subject with some further observations calculated to embrace the views here taken.—*Balt. American.* "T."

Railroads in Austria.—An article from a Vienna paper of May 29th, states that the number of workmen employed on the railroads of Austria, was at that time more than 40,000, and that in a short time the number would be increased to 60,000. The railroad from Vienna to Prague will be finished in 1845.

☞ We are indebted to Mr. John A. Roebling for a valuable communication on the subject of Wire Rope, and to Mr. J. I. Shipman for an interesting report of a Railroad Trial. Both of these communications will appear in the next number.

☞ Several returns to our application for Railroad Tariffs will appear also, in our next.

☞ Arrangements have been made for completing a double track on the Pottsville and Philadelphia railroad. Receipts last month $51,000,—Good.

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